## CLAIMS

1. Apparatus for promoting bone growth, especially for osteosynthesis of bone fragments and/or fixation of bone fractures, which comprises at least one piezoelectric element (18; 20; 29; 33; 34; 45; 46; 54) which is associated with an implant (10; 21; 25; 37; 38; 39) or like bone fixation means (49) and which, under the action of forces, generates electrical pulses which serve as a stimulant for bone growth,

characterised in that

the at least one piezoelectric element (18; ... 54) is an integral component of the implant (10; .... 39 and 49).

2. Apparatus according to claim 1, characterised in that

the implant (10; ... 39 and 49) consists at least in part of a piezoelectric ceramic.

3. Apparatus according to claim 1 or 2, characterised in that

the implant (10; ...) defines one pole, especially the negative pole, and a contact element (19; 24; 30; 35; 36; 47; 48; 55) coming into contact only with surrounding bone and made from an electrically conductive, especially metallic, material tolerable to humans defines the other pole, especially the positive pole, of the piezoelectric element (18; ...).

4. Apparatus according to one of claims 1 to 3, characterised in that

the piezoelectric element (33; 34) is arranged within an implant pocket (31; 32) open towards the bone, especially in such a manner that it terminates substantially flush with the surface of the implant.

5. Apparatus according to one of claims 1 to 4, characterised in that

the implant (10; 21; 43; 44) is in the form of a kind of dowel, in the central hollow space (17) of which is located the piezoelectric element (18; 20; 45; 46).

6. Apparatus according to claim 5, characterised in that

the implant is a pin-like holder for an artificial tooth (11), a bone or pedicle screw (13; 43; 44) or a bone fixation pin (21) or like bone fixation element (49).

7. Apparatus according to one of claims 1 to 4, characterised in that

the implant is a hip-joint socket (25) having at least one opening (28) in its bottom, the piezoelectric element (29) being arranged to be located therein.

8. Apparatus according to claim 7, characterised in that

the piezoelectric element (29) arranged in and filling the opening (28) in the bottom is integrally connected to a piezoelectric layer (29) extending over at least part of the inside of the bottom of the socket.

9. Apparatus according to one of claims 1 to 8, characterised in that

the piezoelectric element is so constructed that, on normal loading of the bone structure, a current having an effective current intensity of about 10-100 μA is arranged to be generated.

10. Apparatus according to one of claims 1 to 9, characterised in that

the piezoelectric element is made from a piezoelectric ceramic, especially a zirconate or titanate ceramic.

11. Apparatus according to one of claims 1 to 10, characterised in that,

when there are at least two piezoelectric elements, they are connected either electrically in series or electrically in parallel.

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